1095 Nuclear Cardiology: Issues of Cost-Effectiveness

Wednesday, March 19, 1997, 3:00 p.m.–5:00 p.m.
Anaheim Convention Center, Hall E
Presentation Hour: 3:00 p.m.–4:00 p.m.

1095-58 Impact of Pharmacologic SPECT Perfusion Imaging on Subsequent Utilization of Coronary Angiography and Outcome

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Previous studies show conflicting results of the impact of exercise SPECT perfusion imaging on subsequent utilization of invasive procedures. This study examined the impact of adenosine SPECT thallium imaging in 1365 patients (pts) with chest pain syndromes with no prior coronary revascularization. There were 586 men and 779 women aged 67 ± 12 yrs. The pre-test probability of CAD was 62 ± 29%. The SPECT images were normal in 740 pts (54%) and abnormal in 625 pts (46%). Subsequent coronary angiography was performed in 57 pts (7.7%) with normal images and in 241 pts (39%) with abnormal images ($p < 0.01$). Follow-up of up to 3 years was available in 221 pts (74%) who had coronary angiography. There were 11 hard events (death or non-fatal myocardial infarction) in pts with abnormal images and in none with normal images ($p < 0.01$). There were also 81 coronary revascularization procedures in the pts with abnormal images and 5 in the pts with normal images ($p < 0.01$). The pts with abnormal images and hard events had more extensive perfusion defects than those with no events (defect size 22 ± 6% vs 17 ± 9%, $p < 0.05$; number of segments with perfusion abnormality 11 ± 5% vs 8 ± 5%, $p < 0.05$).

Thus, the results of adenosine SPECT perfusion imaging have appropriate impact on subsequent utilization of invasive procedures and outcome in pts with intermediate pre-test probability of CAD. Coronary angiography, coronary revascularization and cardiac events are infrequent in pts with normal images.

1095-59 Acute Myocardial Perfusion Imaging for Chest Pain Reduces the Length of Cardiac Work-up: A Randomized Trial

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Although acute myocardial perfusion imaging (MPI) during chest pain correlates well with stress MPI, its impact upon cost and length of cardiac work-up (LOCW) has not been assessed. Accordingly, 33 patients admitted with a moderate or high probability of myocardial ischemia were randomized to usual care or acute Tc-99m sestamibi SPECT imaging during or within 2 hours of chest pain. Acute image results were immediately reported to the attending physician who managed the subsequent work-up. Length of cardiac work-up and associated hospital charges were compared between the 2 groups, including a charge for acute MPI.

	n	LOCW days/pt	Pts in ICU	Charges $/pt
Acute MPI	17	2.0 ± 1.2*	5	3555 ± 1396
No MPI	16	3.2 ± 1.7	2	3467 ± 1879

*p = 0.02 vs no MPI

Acute MPI significantly reduced the length of cardiac work-up by 1.2 days. In addition, despite more ICU admissions in that group, there was no significant increase in charges with acute MPI.

Conclusion: Acute myocardial perfusion imaging for chest pain in patients with at least a moderate probability of myocardial ischemia significantly reduced the length of cardiac work-up at no added expense.

1095-60 Predictors of Cardiac Catheterization in a Multicenter Registry of Stable Angina Patients

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Recent studies suggest that a relationship exists between rates of noninvasive testing and subsequent cardiac catheterization (CATH). We examined a multicenter geographically diverse database of 7,706 stable angina patients from 7 hospitals (mean age = 64 years, 35% female) for factors predictive of CATH ≤ 90 days after stress myocardial perfusion imaging (MPI). The predictive value of clinical history and stress MPI were evaluated by a risk-adjusted multivariable logistic regression model predicting CATH (overall CATH rate = 17%). A clinical risk index was developed based upon each patient's age, sex, symptoms, and cardiac risk factor profile. The table indicates the final multivariable model predicting CATH:

Risk-Adjusted Multivariable Model

	Odds Ratio (95% CI)	p Value
No. Perfusion Areas With		
Ischemia	1.5 (1.4–1.6)	< 0.00001
Infarction	1.1 (1.1–1.2)	< 0.00001
Clinical Risk Index 1.1 (1.0–1.2.)	0.03	

Using an incremental chi-square analysis, stress MPI contributed 92% of the information in predicting CATH.

Conclusion: The extent and severity of perfusion defects by stress myocardial perfusion imaging are highly predictive of resource utilization, and are specifically predictive of subsequent cardiac catheterization.

1095-61 Pharmacoeconomics of Adenosine and Dipyridamole Myocardial Perfusion Imaging

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Adenosine and dipyridamole are FDA-approved as adjuncts for myocardial perfusion imaging (MPI). Reported CAD detection sensitivities and specificities have been largely similar; therefore, making cost-effectiveness dominant in drug selection. We conducted a pharmacoeconomic analysis of IV adenosine and IV dipyridamole use in MPI. The design was a case-control, cost-minimization analysis (direct cost accounting approach estimating institutional costs). A 2:1 (adenosine:dipyridamole; n = 166:n = 83) match based on age, gender, weight, prior MI and prior coronary revascularization was used. Consecutive patients unable to perform adequate exercise referred for MPI to evaluate CAD were included. Agents were administered according to FDA-approved manufacturer recommendations. The setting was a university hospital nuclear medicine department. Costs included drug acquisition, administration, monitoring, adverse event treatment, follow-up care and repeat tests. Although adenosine had a greater acquisition cost than dipyridamole, the remaining four costs were significantly less ($p < 0.001$). The frequency of adverse events was not significantly different between adenosine and dipyridamole. However, adverse events requiring intervention were greater for dipyridamole (24% vs 5%, $p < 0.001$). Indeed, dipyridamole had a significantly greater number of adverse events persisting ≥ 10 min (29% vs 0.6%) and occurring late-onset ($p < 0.001$). Consequently, the total cost per patient was significantly less for adenosine ($379.0 ± 131.9 vs $483.1 ± 224.2, $p < 0.001$). Despite a higher acquisition cost, adenosine was more cost-effective than dipyridamole in conjunction with MPI. Adenosine cost was less because of lower administration, monitoring, adverse event, repeat test and follow-up care costs.

1095-62 Does Age Increase Diagnostic and Follow-Up Cost of Stable Angina Patients? A Multicenter Clinical Study of 9,491 Patients with Perfusion Imaging and Coronary Angiography

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The influence of advanced age on cost efficient resource use has not been investigated in a large series of stable angina patients. We followed 9,491 symptomatic patients for 3 years who underwent stress perfusion imaging at 6 tertiary referral centers. We compared diagnostic and follow-up cost in elderly (age ≥ 65) versus non-elderly (age < 65) patients by analysis of variance. Cost was calculated by Medicare hospital (adjusted by cost charge ratio) and physician billing data. A similar total cost was observed for elderly and non-elderly patients; however, high pretest risk (probability ≥ 0.60) elderly patients had a significantly lower diagnostic and follow-up cost than non-elderly high risk patients despite a higher mortality rate in the elderly (3.0 vs. 1.3%, $p < 0.001$). Subsequent revascularization was similar in elderly vs. non-elderly (4.7 vs. 5.3%, $p > 0.20$); however, more elderly patients received subsequent medical therapy without diagnostic catheterization (49 vs 66%, $p < 0.05$).

Conclusion: 1) Underutilization of diagnostic and follow-up resource use is observed through 3 years of follow-up in elderly patients despite a higher mortality rate, and 2) Younger patients have a more aggressive, but costly management course. Reassessment of diagnostic and follow-up strategies should be considered for stable angina elderly patients.